Tentground
Elk Springs

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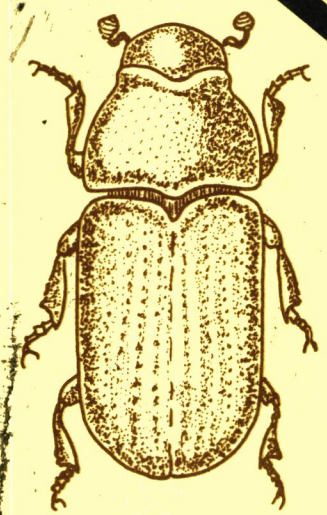
TECHNICAL REPORT R-3 77-13

SIMULATED YIELD TABLES FOR DWARF MISTLETOE MANAGEMENT IN PONDEROSA PINE STANDS (SWYLD2 PROGRAM)

PHASE I. TWO-STORIED STANDS

Chevelon and Lakeside
Ranger Districts
Apache-Sitgreaves
National Forest
Arizona

1977



Southwestern Region

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1977

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INTRODUCTION

Southwestern dwarf mistletoe (Arceuthobium vaginatum subsp. cryptopodum) is the most destructive forest disease in the Southwest. This disease causes growth loss, mortality, deformity, and reduced seed production in infected trees. Timber volume yield is reduced proportionate to the level of mistletoe infestation in a stand. Volume loss in an infested stand may be 10 to 40 percent or more over a rotation. Silvicultural control of dwarf mistletoe is the most efficient method of reducing adverse effects caused by this disease. Removal of mistletoe-infected trees during precommercial and commercial thinning operations is an efficient way to suppress a dwarf mistletoe infestation.

Timber volume loss resulting from a dwarf mistletoe infestation is difficult to assess by direct observation. The effectiveness of silvicultural treatments that reduce mistletoe levels is variable. Researchers have developed a simulated yield program (SWYLD2) that will aid land managers in assessing these problems (Myers, Edminster, and Hawksworth 1976). The SWYLD2 program is designed for use in even-aged or two-storied stands of ponderosa pine. Stands may be either dwarf mistletoe-infested or non-infested. Yield tables generated by the SWYLD2 program help the land manager evaluate management alternatives through examination of simulated yields produced under selected options.

The SWYLD2 program is being evaluated for implementation in the Southwestern Region. Areas were selected in various parts of the Region for development of simulated yield tables for mistletoe-infested stands. The program for implementation of SWYLD2 consists of three phases: I. Development of yield tables for selected stands infested with dwarf mistletoe, II. Evaluation of these stands managed with the aid of SWYLD2 simulations, and III. Implementation of SWYLD2 as a tool in developing timber management programs in mistletoe-infected stands in Region 3. This report is one of a series to be issued during the implementation process.

OBJECTIVE

The purpose of this project was to develop simulated yield tables for two-storied, dwarf mistletoe-infested ponderosa pine stands on Chevelon and Lakeside Ranger Districts, Apache-Sitgreaves National Forest. This report summarizes additional work in Phase I of the SWYLD2 implementation program on Chevelon Ranger District and initial work in Phase I on Lakeside Ranger District. An even-aged stand was sampled in 1975 on Chevelon Ranger District (Technical Report R-3 76-23).

PROCEDURE

The following procedure constituted the two-storied portion of Phase I for this project:

1. Collect data necessary for input in the SWYLD2 program from two-storied, dwarf mistletoe-infested ponderosa pine stands.

2. Combine data with various management alternatives selected by the land manager and produce simulated yield tables for the sampled areas.

3. Assist the land manager in interpreting yield tables and selecting the best combination of management alternatives in dwarf mistletoe-infested stands.

4. Assist the land manager in planning implementation of selected management alternatives.

METHODS

Two areas of two-storied ponderosa pine infested with dwarf mistletoe were sampled in 1976 by personnel from the Forest Insect and Disease Management Staff Unit. One area was sampled on each of the two Ranger Districts.

Sampling Procedure

1. A road log was made from the nearest town to the survey area.

2. A map of the area was obtained and the boundary marked where necessary.

3. Age (at d.b.h.) and height measurements were taken on at least 10 codominant or dominant ponderosa pine trees in each of the two stories.

4. Age and height measurements were taken on 10 dominant ponderosa pines for determination of site index.

5. Sample points were located on an 8-chain grid pattern throughout the area; a .01-acre circular plot was established at each sample point; presence or absence of dwarf mistletoe and d.b.h. were recorded for all live trees 4.5 feet or more in height and less than 6 inches d.b.h.; at the same sample point, a 10 BAF variable-size plot was established; the same variables as in the fixed plot were recorded for live trees 6 inches or greater d.b.h.; in addition, all trees marked for cut in an upcoming timber sale were noted in the surveyed stand on Chevelon Ranger District; data were recorded on automatic data processing forms.

6. Survey data were processed through the NSEC/VI computer program, which summarized field data and provided per-acre estimates of number of trees, basal area, and percent of trees infected with dwarf mistletoe by 1-inch diameter classes; site index, mean d.b.h. of the tree of average basal area, average age, and average height were also calculated from the data. Information on trees marked for cut was summarized also. The summarized data were combined with management alternatives obtained from land managers and then processed through the simulated yield program SWYLD2.

RESULTS AND DISCUSSION

Chevelon Ranger District

A 416-acre area of two-storied ponderosa pine was sampled by collecting data on 65 plots. Location of the area is indicated in Figure 1. Line, plot, and dwarf mistletoe distribution are provided in Figure 2. Plots with dwarf mistletoe had a minimum of one infected sample tree. Dwarf mistletoe occurs in most of the sampled area.

Survey Results Summary

	Overstory*	Understory**
Site index	71	71
Average age (years)	130	30
Average height (feet)	77	26
Number trees/acre	23	282
Basal area/acre	45	25
Average d.b.h. (inches)	18.8	4.0
Percent trees infected with dwarf mistletoe	28	3

This basic stand information was combined with management alternatives selected by Ranger District personnel to produce 36 sets (set = 1 overstory and 1 understory printout) of simulated yield tables. The yield tables were discussed and evaluated with personnel from Chevelon Ranger District. Seven yield tables were selected for use as examples in this report. The SWYLD2 program converts percent trees infected with mistletoe to stand DMR, based on the 6-class rating system. The stand DMR reflects the average mistletoe rating for all trees in a sampled area.

* Overstory = all live trees $\geq$ 12.0 inches d.b.h.
** Understory = all live trees $\geq$ 4.5 feet tall and $<$ 12.0 inches d.b.h.

Because overstory management alternatives were held constant, only one overstory simulation is presented (Table 1). Two-thirds of the overstory basal area was removed in the first cut, with the remainder being cut in 20 years (final removal). The first cut simulated logging from above, which reduced the dwarf mistletoe infestation to a low level (Table 1). Based on the sample of marked trees, 17 percent (DMR = .2) of the residual trees per acre will be infected with dwarf mistletoe. Thus, the buildup of dwarf mistletoe in the residual overstory and spread of the disease into the understory will be greater than that simulated in Tables 1-7.

All understory simulations were made to biological age 140 (Tables 2-7). The regeneration plan was constant, with a 3-cut shelterwood method being used. Regeneration cuts were made at age 100, 120, and 140. All intermediate cuts were made from below and a 20-year cutting cycle was simulated. Three growing stock level (GSL) combinations for the initial and subsequent thinnings were simulated. A 20-year (Tables 2, 4, & 6) and 30-year (Tables 3, 5, & 7) delay before initial stand entry was also simulated.

The SWYLD2 program will not simulate intermediate cuts when the stand DMR equals or exceeds 3.0 (Tables 2 & 4, age 90). A stand DMR of 3.0 indicates 86 percent of the trees are infected with dwarf mistletoe, and the stand should be regenerated.

Each of the three GSL combinations was tested with a 20- and 30-year delay before initial stand entry (Table 2 vs. 3, 4 vs. 5, 6 vs. 7). An initial GSL of 70 and subsequent GSL 80, with a 20-year delay, resulted in the highest total board-foot yield per acre (Table 6). In Table 6, the GSL combination of 70-80 resulted in lower dwarf mistletoe levels and more growing space per tree than other simulations. The difference between highest and lowest simulated yields of 5,400 board feet per acre indicates the importance of proper silvicultural treatment in mistletoe-infested stands. Dwarf mistletoe must be controlled by each stand entry if maximum timber volume production is to be realized. By close examination of the yield tables, land managers can select the combination of management alternatives that best meet current management objectives.

Lakeside Ranger District - Elk Springs

A 1,024-acre area of two-storied ponderosa pine was sampled by collecting data on 160 plots. Location of the area is indicated in Figure 3. Line, plot, and dwarf mistletoe distribution are provided in Figure 4. Plots with dwarf mistletoe had a minimum of one infected sample tree. Dwarf mistletoe occurred in most of the area sampled.

Survey Results Summary

	Overstory*	Understory**
Site index	76	76
Average age (years)	120	50
Average height (feet)	79	35
Number trees/acre	17	599
Basal area/acre	31	43
Average d.b.h. (inches)	18.3	3.6
Percent trees infected with dwarf mistletoe	26	8

This basic stand information was combined with management alternatives selected by Ranger District personnel to produce 22 sets of simulated yield tables. The yield tables were discussed and evaluated with personnel from Lakeside Ranger District. Six yield tables were selected for use as examples in this report. The SWYLD2 program converts percent trees infected with mistletoe to stand DMR, based on the 6-class rating system. The stand DMR reflects the average mistletoe rating for all trees in a sampled area.

Because overstory management alternatives were held constant, only one overstory simulation is presented (Table 8). Forty-six percent of the overstory basal area was removed in the first cut at biological age 120. The remainder was carried for 20 years and cut in the final removal at age 140 (Table 8). The first cut simulated a logging from above, which reduced the DMR to a low level. The buildup of mistletoe in the 20 years before final removal resulted from latent infections in residual trees. Spread of dwarf mistletoe from infected residual overstory trees to understory is simulated for the 20-year period before final removal (Tables 8-13).

Understory simulations were made to biological age 150. The regeneration scheme was constant, with a 3-cut shelterwood method being used. Regeneration cuts were made at ages 110, 130, and 150. Various growing stock level (GSL) combinations were simulated for the initial thin and all subsequent intermediate cuts. All thinnings were made from below, and a 20-year cutting cycle was simulated. Commercial minimum requirements were set for all simulations. In order for each cut after the initial thinning to be made, at least 160 merchantable cubic feet, or 1,500 board feet, had to be available for removal. Definitions of merchantability are presented at the bottom of each yield table (Tables 9-13).

* Overstory = all live trees $\geq$12.0 inches d.b.h.
** Understory = all live trees $\geq$ 4.5 feet tall and $<$12.0 inches d.b.h.

Total board-foot volume produced over the rotation varied from 14,800 board feet per acre (Table 12) to 16,700 board feet per acre (Table 11). The variation in timber volume produced resulted from altering initial and subsequent GSL's. An intermediate cut scheduled at age 70 was not performed in several simulations (Tables 9, 11, & 12). The thinning was not performed at age 70 because insufficient growing stock was available, at the specified subsequent GSL, to meet the commercial minimum of 160 merchantable cubic feet per acre. In Table 13, the initial cut was bypassed due to insufficient growing stock to perform a thinning to GSL 120. Dwarf mistletoe was controlled in all simulations (Tables 9-13). By close examination of the yield tables, land managers can select the combination of management alternatives that best meet current management objectives.

CONCLUSIONS AND RECOMMENDATIONS

Sufficient stand data were obtained on Chevelon and Lakeside Ranger Districts for use in the simulated yield program SWYLD2. The data were combined with various management alternatives selected by Ranger District personnel, and yield tables were produced for each sampled area. Examination of yield tables by the land manager and personnel from Forest Insect and Disease Management revealed several important factors: (1) volume losses caused by dwarf mistletoe can be substantial when infested stands are improperly treated (FSM 5200); (2) control of dwarf mistletoe is dependent on management alternatives selected for use in a particular area; (3) total volume production per acre is dependent on management alternatives selected for use in a particular area.

The simulated yield program SWYLD2 is a useful tool for land managers. The limits of the program will be revealed after on-the-ground situations, in which simulated yield information has been applied, are compared with post-treatment simulated yields. Based on results of this report, the following plan of action is recommended for the areas sampled on Chevelon and Lakeside Ranger Districts:

1. Select the yield table and accompanying management alternatives that best meet current management objectives, while reducing dwarf mistletoe to acceptable levels (FSM 5260).

2. Implement management alternatives selected for the first stand entry in the overstory and understory.

3. With the assistance of personnel from the Forest Insect and Disease Management Staff Unit, complete a post-treatment evaluation of the area.

4. Compare results of the post-treatment evaluation with simulated yield predictions (Phase II).

The growing stock levels used to generate yield tables for stands considered in this report are not intended as "best" growing stock levels for widespread use; however, they demonstrate the need for case-by-case selection of a suitable level based on the manager's objectives in conjunction with mistletoe management.

Instructions for use of the SWYLD2 program and detailed descriptions of management alternatives are provided by Edminster and Hawksworth (1976). Additional information on the SWYLD2 program, relative to dwarf mistletoe management, may be obtained by contacting Forest Insect and Disease Management. For general information on the SWYLD2 program, contact Forest Insect and Disease Management or Timber Management.

LITERATURE CITED

Edminster, C. B., and F. G. Hawksworth. 1976. User's guide to SWYLD2: Yield tables for even-aged and two-storied stands of southwestern ponderosa pine, including effects of dwarf mistletoe. USDA Forest Serv. Gen. Tech. Rep. RM-23. 8 pp.

Myers, C. A., C. B. Edminster, and F. G. Hawksworth. 1976. SWYLD2: Yield tables for even-aged and two-storied stands of southwestern ponderosa pine, including effects of dwarf mistletoe. USDA Forest Serv. Res. Pap. RM-163. 25 pp.

Walters, J. W., and N. R. Olson. 1976. Simulated yield tables for dwarf mistletoe management in ponderosa pine stands (SWYLD2 program). Tech. Rep. R-3 76-23. 13 pp.

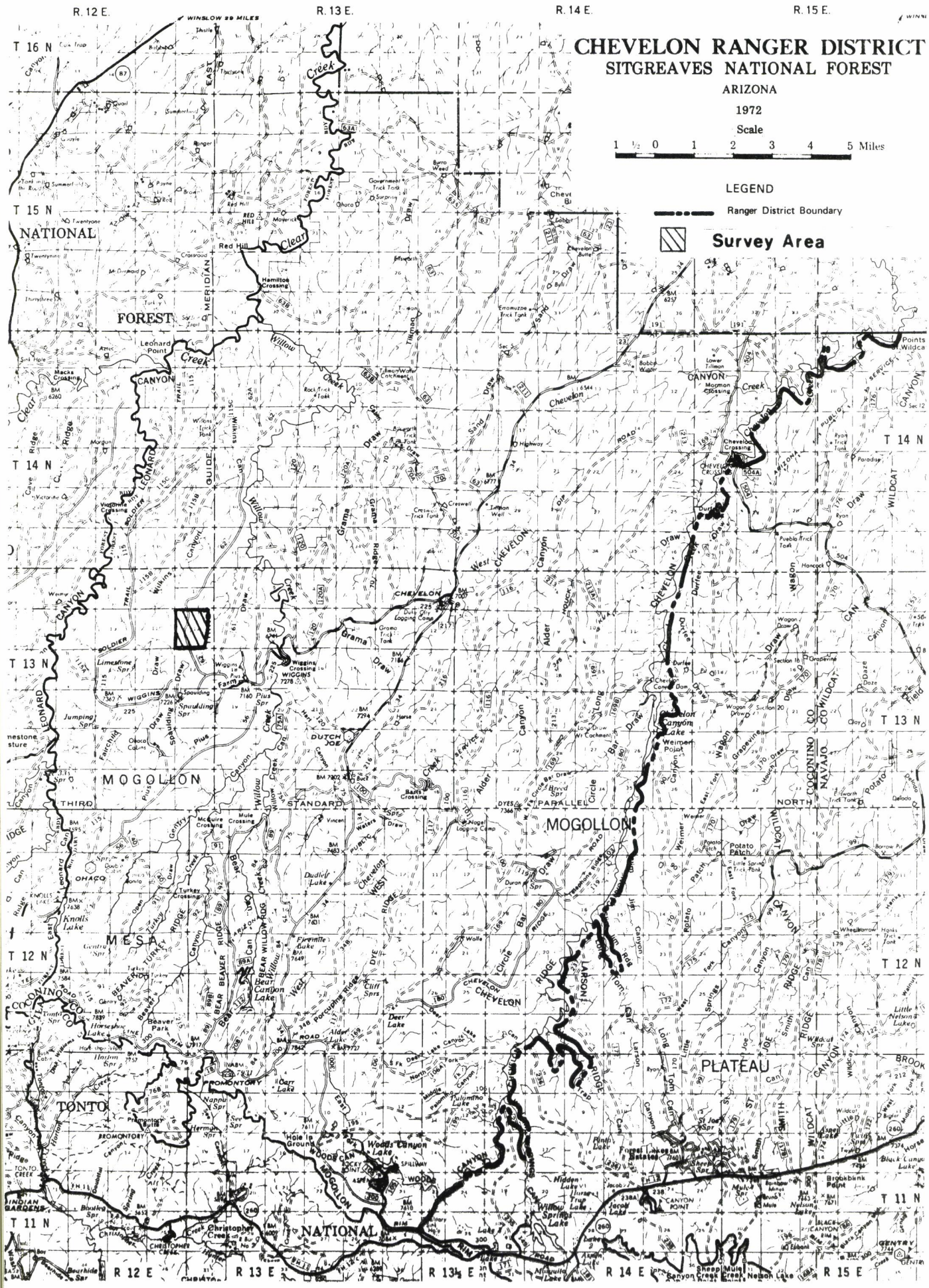

CHEVELON RANGER DISTRICT
SITGREAVES NATIONAL FOREST
ARIZONA
1972
Scale
1 ½ 0 1 2 3 4 5 Miles
LEGEND
Ranger District Boundary
Survey Area
R. 12 E.
R. 13 E.
R. 14 E.
R. 15 E.
T 16 N
T 15 N
T 14 N
T 13 N
T 12 N
T 11 N
NATIONAL FOREST
MOGOLLON
MESA
TONTO
PLATEAU
CHEVELON CANYON
CHEVELON CROSSING
WINSLOW 25 MILES

Figure 1

65 plots
416 acres

Scale: 1 cm - 8 chains

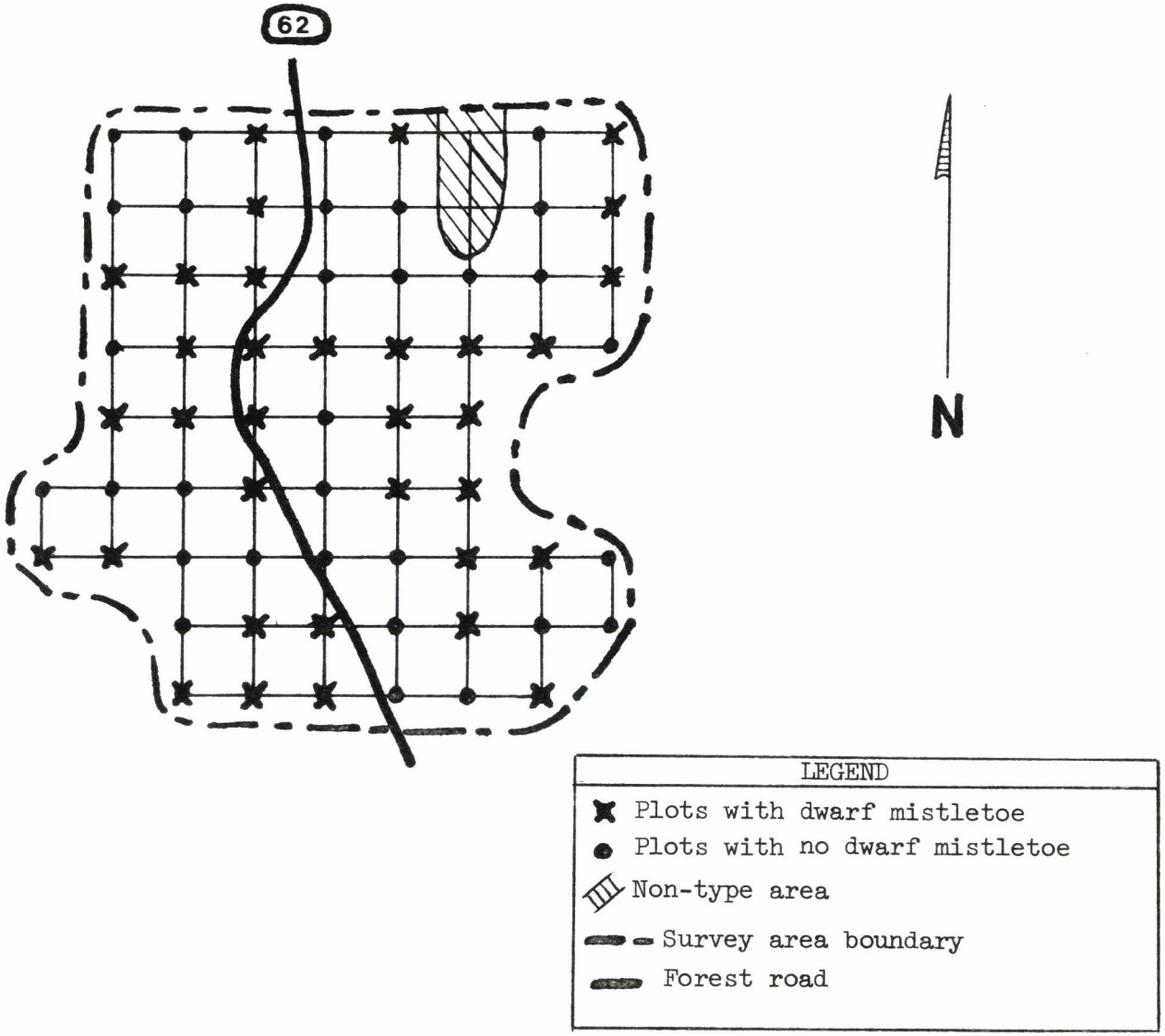
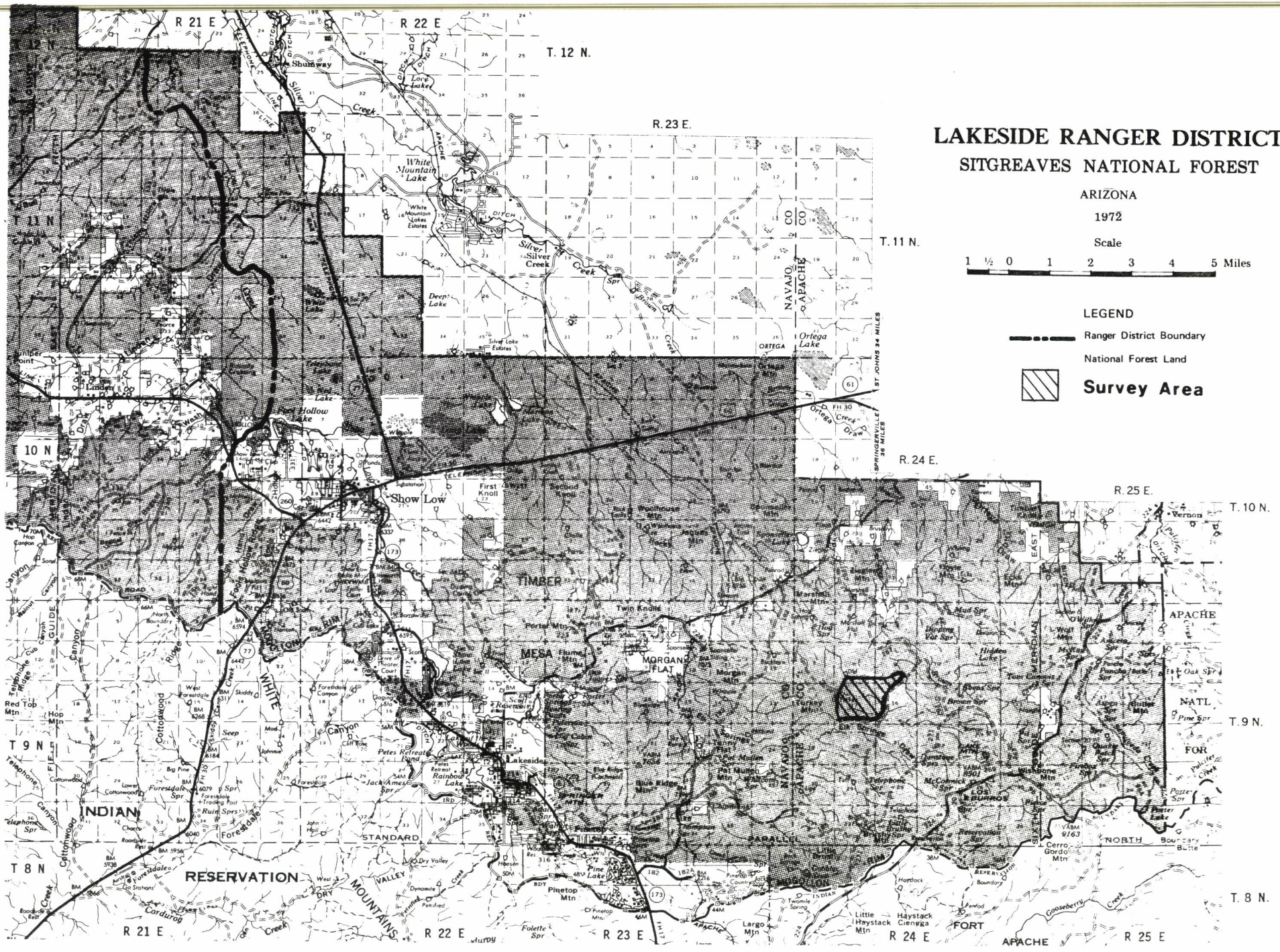


Fig. 2.--Line and plot distribution with an indication of dwarf mistletoe presence or absence; Chevelon Ranger District; T13N, R12E, Sec. 12. Tentground

34 16


LAKESIDE RANGER DISTRICT
SITGREAVES NATIONAL FOREST
ARIZONA
1972
Scale
1 ½ 0 1 2 3 4 5 Miles
LEGEND
Ranger District Boundary
National Forest Land
Survey Area
R 21 E
R 22 E
R. 23 E.
R. 24 E.
R. 25 E.
T. 12 N.
T. 11 N.
T. 10 N.
T. 9 N.
T. 8 N.
Show Low
Lakeside
Pinetop
Pinetop Mtn
Deep Lake
White Mountain Lake
Silver Creek
Orejga Lake
Fool Hollow Lake
Rainbow Lake
Pine Lake
Cerro Gordo Mtn
Largo Mtn
Little Haystack Mtn
Haystack Cienega
Red Top Mtn
Hop Mtn
Pinetop Mtn
Twin Knolls
First Knoll
Porter Mtn
Flume Mtn
Turkey Mtn
Bear Mtn
Bald Mtn
Bunkhouse Mtn
Marshall Mtn
Mud Spr
Hidden Lake
Oak Spr
Pine Spr
Porter Spr
Porter Lake
Bishop Mtn
Mc Connick Mtn
Bear Wallow Mtn
Blue Ridge Mtn
Petes Retreat Pond
Jack Ames Spr
Forestdale Spr
Rim Spr
Cottonwood Spr
Seep
Dry Valley
Dynamite
Petrified
Hansen
Folette Spr
Twomile Spring
Horstock
Goosebery Creek
Cardurey Creek
Telephone Canyon
Guide Canyon
Cottonwood Canyon
Porter Mtn Rim
Mogollon Rim
Show Low Creek
Silver Creek
Deep Hollow Wash
Ortega Creek
Porter Creek
Pinetop Mtn Rim
Dry Mountains
Valley
Meridian
Navajo
Apache
Timber
Mesa
Morgan Flat
Standard
Parallel
Indian
Reservation
Fort Apache
Natl For Boundary
Lakeside
Pinetop
Show Low
Vernon
Springerville 39 Miles
St Johns 34 Miles
Ortega
Fh 30
Fh 31
Fh 32
Fh 33
Fh 34
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Fh 100

Figure 3

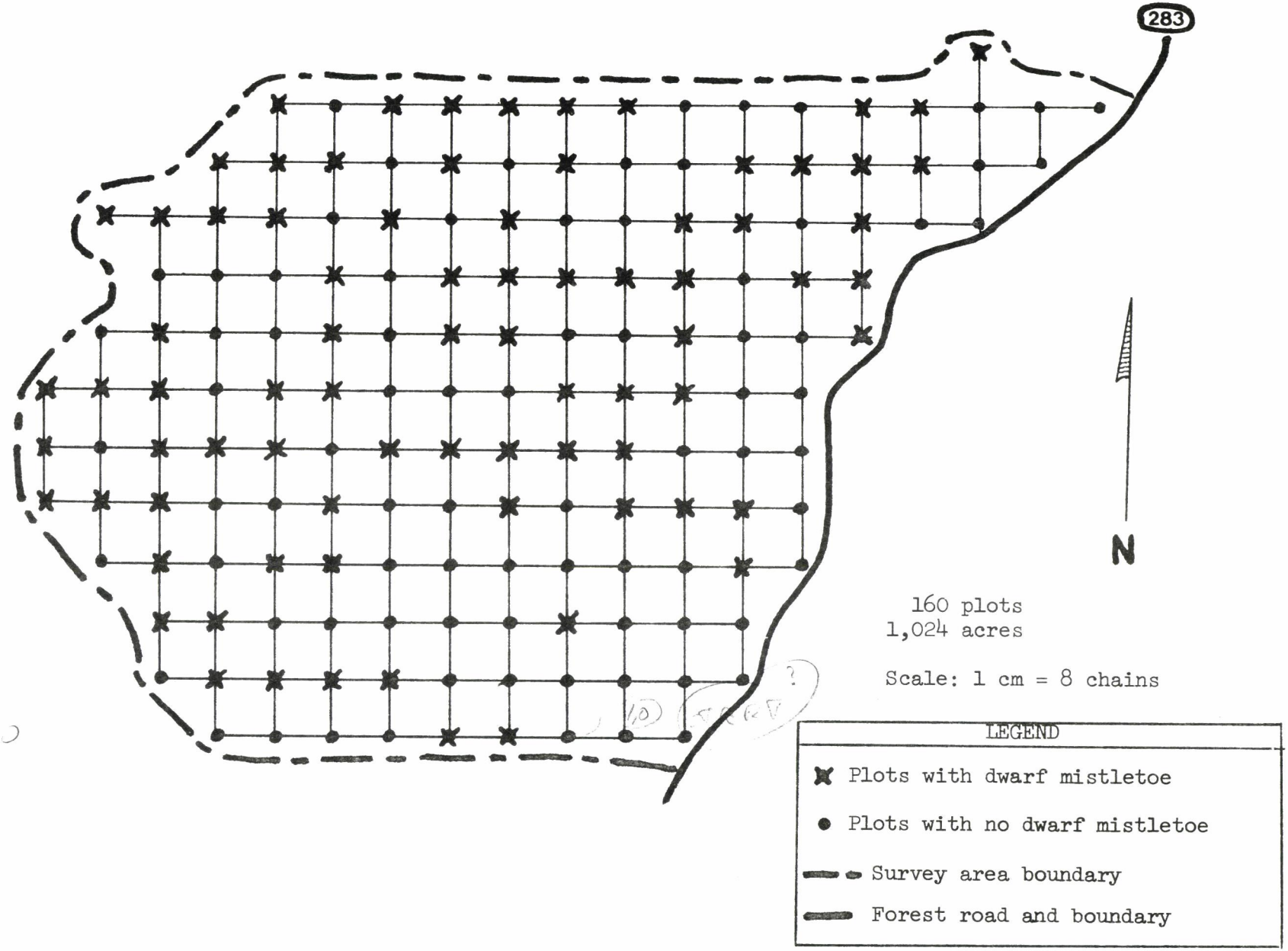

Fig. 4.--Line and plot distribution with an indication of dwarf mistletoe presence or absence; Lakeside Ranger District; T9N, R24E, Sec. 7, 8, 16, & 18.

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6,, OVERSTORY.

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 45, SUBSEQUENT- 45,

STND 6 TENTGROUND CHEVELON RD 76

		CHARACTERISTICS BEFORE AND AFTER THINNING							PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
130	.3	23	44	18.8	77	1300	1260	6100					
130	.0+	9	15	17.3	74	410	400	1800	14	29	890	860	4300
140	.1	9	18	18.9	77	510	490	2400					
150	.2	9	20	20.2	79	600	590	3000					
							TOTAL YIELDS				1490	1450	7300

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 130,, 27. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 1

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6,, UNDERSTORY,

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 80, SUBSEQUENT- 100,

STND 6 TENTGROUND CHEVELON RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
50	.7	253	64	6.8	44	1060	720	0	25	4	70	30	0
60	1.1	252	88	8.0	50	1590	1290	0					
70	2.0	229	101	9.0	57	2030	1760	2100					
70	1.8	216	98	9.1	57	1950	1700	2100	13	3	80	60	0
80	2.6	191	104	10.0	63	2380	2120	4400					
90	3.5	162	105	10.9	68	2620	2380	7000					
90	3.5	162	105	10.9	68	2620	2380	7000	0	0	0	0	0
100	4.3	132	100	11.8	72	2680	2460	8700					
100	3.4	53	50	13.2	73	1380	1290	4900	79	50	1300	1170	3800
110	4.1	44	51	14.6	77	1480	1400	5700					
120	4.8	35	49	16.0	80	1480	1410	6100					
120	4.4	23	35	16.8	81	1080	1040	4700	12	14	400	370	1400
130	4.9	18	33	18.4	84	1060	1020	4900					
140	5.1	14	31	20.0	86	1000	970	5000					
						TOTAL YIELDS					2850	2600	10200

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30,, 5. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 2

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6,, UNDERSTORY,

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 80, SUBSEQUENT- 100,

STND 6 TENTGROUND CHEVELON RD 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
60	1.4	276	94	7.9	50	1700	1360	500					
60	.9	201	74	8.2	51	1340	1100	500	75	20	360	260	0
70	1.4	200	94	9.3	57	1890	1660	2400					
80	2.2	180	104	10.3	63	2400	2160	5100					
80	2.0	170	100	10.4	63	2310	2090	5100	10	4	90	70	0
90	2.9	149	104	11.3	68	2610	2390	8000					
100	3.7	125	101	12.2	72	2740	2530	9100					
100	2.8	50	50	13.6	74	1390	1300	5100	75	51	1350	1230	4000
110	3.5	43	53	15.0	77	1540	1460	6000					
120	4.2	36	53	16.4	81	1610	1540	6800					
120	3.7	21	34	17.3	81	1060	1010	4600	15	19	550	530	2200
130	4.2	21	41	19.0	84	1330	1280	6300					
140	4.6	17	39	20.6	87	1300	1260	6600					
						TOTAL YIELDS					3650	3350	12800

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30., 3. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 3

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6,, UNDERSTORY,

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 80, SUBSEQUENT- 90,

STND 6 TENTGROUND CHEVELON RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
50	.7	253	64.	6.8	44	1060	720	0	25	4	70	30	0
60	1.1	252	88	8.0	50	1590	1290	0					
70	2.0	229	101	9.0	57	2030	1760	2100					
70	1.6	191	88	9.2	57	1770	1550	2000	38	13	260	210	100
80	2.5	170	96	10.2	63	2210	1990	4500					
90	3.3	145	99	11.2	68	2490	2270	7400					
90	3.3	145	99	11.2	68	2490	2270	7400	0	0	0	0	0
100	4.2	119	95	12.1	72	2550	2350	8500					
100	3.2	45	45	13.5	74	1230	1150	4400	74	50	1320	1200	4100
110	3.9	38	47	15.0	77	1360	1280	5500					
120	4.6	31	46	16.5	80	1400	1340	5900					
120	4.2	19	31	17.4	81	970	930	4300	12	15	430	410	1600
130	4.6	16	32	19.1	84	1020	980	4800					
140	4.7	13	31	20.8	86	1010	980	5200					
							TOTAL YIELDS				3090	2830	11000

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30,, 5. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 4

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6., UNDERSTORY.

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 80. SUBSEQUENT- 90.

STND 6 TENTGROUND CHEVELON RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
60	1.4	276	94	7.9	50	1700	1360	500					
60	.9	201	74	8.2	51	1340	1100	500	75	20	360	260	0
70	1.4	200	94	9.3	57	1890	1660	2400					
80	2.2	180	104	10.3	63	2400	2160	5100					
80	1.9	150	90	10.5	64	2090	1890	4700	30	14	310	270	400
90	2.7	132	95	11.5	68	2410	2210	7800					
100	3.6	112	95	12.5	73	2580	2390	8800					
100	2.6	42	45	14.0	74	1250	1170	4600	70	50	1330	1220	4200
110	3.3	37	48	15.5	78	1420	1350	5700					
120	4.0	31	49	17.0	81	1500	1430	6500					
120	3.5	18	31	17.9	82	980	940	4400	13	18	520	490	2100
130	3.8	18	38	19.7	84	1230	1190	6000					
140	4.2	18	45	21.4	87	1490	1450	7800					
						TOTAL YIELDS					4010	3690	14500

MERCH. CU. FT. = TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. = TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED = 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30., 5. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 5

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6., UNDERSTORY.

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 70. SUBSEQUENT- 80.

STND 6 TENTGROUND CHEVELON RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
50	.5	218	57	6.9	44	940	650	0	60	11	190	100	0
60	1.0	217	80	8.2	51	1440	1190	500					
70	1.4	216	102	9.3	57	2040	1790	2600					
70	1.0	158	79	9.6	58	1630	1450	2400	58	23	410	340	200
80	1.4	157	98	10.7	64	2280	2070	5600					
90	2.2	142	104	11.6	69	2640	2420	8500					
90	1.8	104	80	11.9	69	2050	1890	6700	38	24	590	530	1800
100	2.6	93	86	13.0	73	2340	2180	8200					
100	1.7	35	40	14.4	75	1110	1040	4200	58	46	1230	1140	4000
110	2.3	32	45	16.0	78	1320	1260	5500					
120	3.0	28	47	17.5	82	1450	1390	6400					
120	2.3	15	28	18.5	83	880	850	4100	13	19	570	540	2300
130	3.1	15	34	20.4	85	1110	1070	5600					
140	3.9	15	40	22.2	88	1350	1320	7300					
						TOTAL YIELDS					4340	3970	15600

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30., 3. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 6

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 6., UNDERSTORY.

SITE INDEX 71
THINNING INTENSITY-- INITIAL- 70. SUBSEQUENT- 80.

STND 6 TENTGROUND CHEVELON RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
30	.1	282	25	4.0	26	360	0	0					
40	.5	280	46	5.5	35	680	260	0					
50	1.0	278	68	6.7	44	1130	750	0					
60	1.4	276	94	7.9	50	1700	1360	500					
60	.8	173	65	8.3	51	1180	980	500	103	29	520	380	0
70	1.2	172	85	9.5	58	1740	1530	2400					
80	2.1	157	94	10.5	63	2180	1980	5000					
80	1.8	128	80	10.7	64	1860	1690	4500	29	14	320	290	500
90	2.6	114	87	11.8	69	2200	2020	7200					
100	3.4	98	88	12.8	73	2380	2210	8300					
100	2.5	36	40	14.5	75	1120	1060	4200	62	48	1260	1150	4100
110	3.1	32	44	15.9	78	1300	1240	5300					
120	3.7	27	45	17.4	81	1370	1320	6100					
120	3.2	15	27	18.3	82	850	820	3900	12	18	520	500	2200
130	4.0	15	33	20.2	85	1080	1050	5400					
140	4.8	15	39	21.9	87	1310	1280	7000					
						TOTAL YIELDS					3930	3600	13800

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 30., 3. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 7

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8., OVERSTORY.

SITE INDEX 76

THINNING INTENSITY-- INITIAL- 31. SUBSEQUENT- 31.

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

		CHARACTERISTICS BEFORE AND AFTER THINNING							PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
120	.3	17	31	18.3	79	930	900	4300					
120	.0+	11	18	17.3	77	520	500	2300	6	13	410	400	2000
130	.1	11	21	18.8	80	640	620	3000					
140	.2	11	24	20.0	82	750	730	3700					
						TOTAL YIELDS				1160	1130		5700

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 120., 26. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 8

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8,, UNDERSTORY.

SITE INDEX 76
THINNING INTENSITY-- INITIAL- 80, SUBSEQUENT- 90.

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
50	.2	599	42	3.6	35	820	0	0					
50	.0+	411	34	3.9	36	630	0	0	188	8	190	0	0
60	.1	408	63	5.3	43	1110	360	0					
70	.1	403	90	6.4	50	1710	1030	0					
70	.1	403	90	6.4	50	1710	1030	0	0	0	0	0	0
80	.6	398	119	7.4	56	2420	1820	0					
90	1.0	390	143	8.2	61	3100	2550	1700					
90	.3	211	85	8.6	62	1860	1570	1300	179	58	1240	980	400
100	.7	210	108	9.7	67	2600	2310	4200					
110	1.2	209	128	10.6	70	3320	3010	8200					
110	.1	53	45	12.5	73	1220	1130	4100	156	83	2100	1880	4100
120	.4	53	57	14.0	76	1610	1510	6000					
130	.8	53	69	15.4	79	2040	1930	8200					
130	.0+	14	23	17.4	81	710	680	3100	39	46	1330	1250	5100
140	.2	14	29	19.5	84	920	890	4500					
150	.3	14	35	21.4	86	1150	1120	6000					
						TOTAL YIELDS					6010	5230	15200

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 5.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED, NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 50,, 8. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 9

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8,, UNDERSTORY.

SITE INDEX 76

THINNING INTENSITY-- INITIAL- 90, SUBSEQUENT- 90,

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
50	.2	599	42	3.6	35	820	0	0					
50	.0+	470	37	3.8	36	690	0	0	129	5	130	0	0
60	.1	466	66	5.1	43	1180	330	0					
70	.1	459	93	6.1	50	1780	940	0					
70	.0+	304	68	6.4	51	1300	780	0	155	25	480	160	0
80	.1	302	95	7.6	57	1940	1500	0					
90	.1	299	121	8.6	62	2610	2220	2000					
90	.0+	201	87	8.9	62	1890	1630	1700	98	34	720	590	300
100	.1	200	109	10.0	67	2650	2370	5000					
110	.1	199	129	10.9	70	3360	3060	9200					
110	.0+	50	45	12.8	73	1210	1120	4200	149	84	2150	1940	5000
120	.1	50	57	14.4	76	1620	1520	6100					
130	.1	50	68	15.8	79	2030	1930	8300					
130	.0+	13	22	17.7	81	680	650	3100	37	46	1350	1280	5200
140	.1	13	28	19.8	84	880	860	4300					
150	.1	13	33	21.7	86	1090	1070	5800					
							TOTAL YIELDS				5920	5040	16000

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 50,, 8. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 10

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8., UNDERSTORY.

SITE INDEX 76
THINNING INTENSITY-- INITIAL- 70. SUBSEQUENT- 100.

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
50	.2	599	42	3.6	35	820	0	0					
50	.0+	353	31	4.0	36	560	0	0	246	11	260	0	0
60	.1	351	56	5.4	43	980	350	0					
70	.1	347	80	6.5	50	1520	950	0					
70	.1	347	80	6.5	50	1520	950	0	0	0	0	0	0
80	.6	344	108	7.6	56	2200	1700	0					
90	1.0	339	134	8.5	61	2890	2440	2100					
90	.5	227	96	8.8	62	2080	1790	1800	112	38	810	650	300
100	.9	226	118	9.8	67	2860	2550	5000					
110	1.3	224	140	10.7	70	3630	3300	9400					
110	.2	59	50	12.5	73	1350	1250	4600	165	90	2280	2050	4800
120	.6	59	63	14.0	76	1790	1680	6700					
130	.9	59	75	15.3	79	2240	2120	8900					
130	.0+	15	24	17.2	81	740	710	3200	44	51	1500	1410	5700
140	.2	15	30	19.2	83	960	920	4600					
150	.3	15	36	21.1	86	1190	1160	6200					
						TOTAL YIELDS					6040	5270	16700

MERCH. CU. FT. = TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. = TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED = 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED, NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 50., 8. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 11

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8., UNDERSTORY.

SITE INDEX 76
THINNING INTENSITY-- INITIAL- 90. SUBSEQUENT- 100.

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
50	.2	599	42	3.6	35	820	0	0					
50	.0+	470	37	3.8	36	690	0	0	129	5	130	0	0
60	.1	466	66	5.1	43	1180	330	0					
70	.1	459	93	6.1	50	1780	940	0					
70	.1	459	93	6.1	50	1780	940	0	0	0	0	0	0
80	.6	452	124	7.1	56	2540	1820	0					
90	1.0	440	150	7.9	61	3250	2610	1000					
90	.3	247	93	8.3	62	2030	1680	1000	193	57	1220	930	0
100	.8	245	116	9.3	66	2760	2430	3600					
110	1.2	242	137	10.2	70	3540	3190	7500					
110	.1	64	50	12.0	72	1340	1240	4400	178	87	2200	1950	3100
120	.5	64	64	13.5	76	1800	1680	6500					
130	.8	64	76	14.8	78	2260	2140	8800					
130	.0+	16	24	16.7	81	740	710	3200	48	52	1520	1430	5600
140	.2	16	31	18.7	83	970	930	4500					
150	.3	16	37	20.6	85	1210	1170	6100					
							TOTAL YIELDS				6280	5480	14800

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 50., 8. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 12

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 8,, UNDERSTORY,

SITE INDEX 76
THINNING INTENSITY-- INITIAL- 120, SUBSEQUENT- 100,

STND 8 ELK SPRINGS LAKE SIDE RD JULY 76 SECONDARY RUNS

	CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
50	.2	599	42	3.6	35	820	0	0					
50	.2	599	42	3.6	35	820	0	0	0	0	0	0	0
60	.5	593	78	4.9	42	1410	0	0					
70	.9	580	114	6.0	50	2210	1110	0					
70	.3	337	75	6.4	51	1450	880	0	243	39	760	250	0
80	.7	334	102	7.5	57	2110	1610	0					
90	1.2	330	127	8.4	62	2790	2330	1800					
90	.7	231	95	8.7	63	2100	1790	1600	99	32	690	540	200
100	1.1	229	118	9.7	67	2870	2550	4700					
110	1.9	213	131	10.6	71	3420	3100	8500					
110	.9	61	50	12.3	73	1360	1260	4600	152	81	2060	1840	3900
120	1.2	61	63	13.8	76	1820	1700	6700					
130	1.9	58	72	15.1	79	2160	2040	8500					
130	.9	16	25	16.9	81	770	730	3300	42	47	1390	1310	5200
140	1.1	16	31	18.9	84	990	960	4700					
150	1.3	16	38	20.8	86	1240	1210	6300					
						TOTAL YIELDS					6140	5150	15400

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 160. CUBIC FEET AND 1500. BOARD FEET.
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS NOT ALLOWED.
AT INITIAL AGE 50,, 8. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 13

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11 SIMULATED YIELD TABLES FOR DWARF MISTLETOE MANAGEMENT IN PONEROSA PINE STANDS Cuba_SB761 U7S7 77-12

USFS01036-11

7"x30 Riviera

TECHNICAL REPORT R-3 77-12

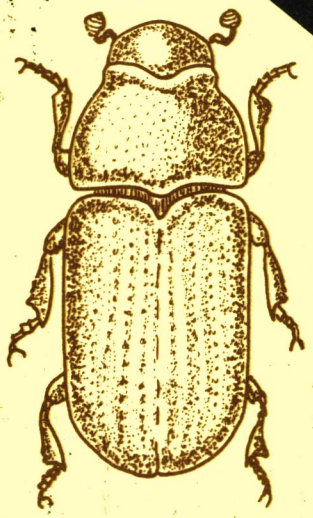
SIMULATED YIELD TABLES FOR DWARF MISTLETOE MANAGEMENT IN PONDEROSA PINE STANDS (SWYLD2 PROGRAM)

PHASE I. TWO-STORIED STANDS

Cuba and Jemez Ranger Districts
Santa Fe National Forest
New Mexico

1977

SB761
U757
77-12



Southwestern Region

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TECHNICAL REPORT

SIMULATED YIELD TABLES FOR DWARF MISTLETOE MANAGEMENT IN PONDEROSA PINE STANDS (SWYLD2 PROGRAM)

PHASE I. TWO-STORIED STANDS

Cuba and Jemez Ranger Districts
Santa Fe National Forest
New Mexico

1977

Forest Insect and Disease Management
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INTRODUCTION

Southwestern dwarf mistletoe (Arceuthobium vaginatum subsp. cryptopodum) is the most destructive forest disease in the Southwest. This disease causes growth loss, mortality, deformity, and reduced seed production in infected trees. Timber volume yield is reduced proportionate to the level of mistletoe infestation in a stand. Volume loss in an infested stand may be 10 to 40 percent or more over a rotation. Silvicultural control of dwarf mistletoe is the most efficient method of reducing adverse effects caused by this disease. Removal of mistletoe-infected trees during precommercial and commercial thinning operations is an efficient way to suppress a dwarf mistletoe infestation.

Timber volume loss resulting from a dwarf mistletoe infestation is difficult to assess by direct observation. The effectiveness of silvicultural treatments that reduce mistletoe levels is variable. Researchers have developed a simulated yield program (SWYLD2) that will aid land managers in assessing these problems (Myers, Edminister, and Hawksworth 1976). The SWYLD2 program is designed for use in even-aged or two-storied stands of ponderosa pine. Stands may be either dwarf mistletoe-infested or non-infested. Yield tables generated by the SWYLD2 program help the land manager evaluate management alternatives through examination of simulated yields produced under selected options.

The SWYLD2 program is being evaluated for implementation in the Southwestern Region. Areas were selected in various parts of the Region for development of simulated yield tables for mistletoe infested stands. The program for implementation of SWYLD2 consists of three phases: I. Development of yield tables for selected stands infested with dwarf mistletoe, II. Evaluation of these stands managed with the aid of SWYLD2 simulations, and III. Implementation of SWYLD2 as a tool in developing timber management programs in mistletoe-infected stands in Region 3. This report is one of a series to be issued during the implementation process.

OBJECTIVE

The purpose of this project was to develop simulated yield tables for two-storied, dwarf mistletoe-infested ponderosa pine stands on Cuba and Jemez Ranger Districts, Santa Fe National Forest. This report summarizes additional work in Phase I of the SWYLD2 implementation program on Cuba and Jemez Ranger Districts. Even-aged stands were sampled in 1975 on both Ranger Districts (Tech. Rep. R-3 76-21).

PROCEDURE

The following procedure constituted the two-storied portion of Phase I for this project:

1. Collect data necessary for input in the SWYLD2 program from two-storied, dwarf mistletoe-infested ponderosa pine stands.

2. Combine data with various management alternatives selected by the land manager and produce simultated yield tables for the sampled areas.

3. Assist the land manager in interpreting yield tables and selecting the best combination of management alternatives in dwarf mistletoe-infested stands.

4. Assist the land manager in planning implementation of selected management alternatives.

METHODS

Three areas of two-storied ponderosa pine infested with dwarf mistletoe were sampled in 1976 by personnel from the Forest Insect and Disease Management Staff Unit. Two areas were located on the Jemez Ranger District and one area was on the Cuba Ranger District, Santa Fe National Forest.

Sampling Procedure

1. A road log was made from the nearest town to the survey area.

2. A map of the area was obtained and the boundary marked when necessary.

3. Age (at d.b.h.) and height measurements were taken on at least 10 codominant or dominant ponderosa pine trees in each of the two stories.

4. Age and height measurements were taken on 6 to 10 dominant ponderosa pines for determination of site index. Number of sample trees taken was dependent on size of the area.

5. Sample points were located on an 8-chain grid pattern throughout the area; a .01-acre circular plot was established at each sample point; presence or absence of dwarf mistletoe and d.b.h. were recorded for all live trees 4.5 feet or more in height and less than 6 inches d.b.h.; at the same sample point, a 10 BAF variable-size plot was established; the same variables as in the fixed plot were recorded for live trees 6 inches or greater d.b.h.; in addition, all trees marked for cut in an upcoming timber sale were noted (Jemez RD, Stand I only); data were recorded on automatic data processing forms.

6. Survey data were processed through the NSEC/VI computer program, which summarized field data and provided per-acre estimates of number of trees, basal area, and percent of trees infected with dwarf mistletoe by 1-inch diameter classes; site index, mean d.b.h. of the tree of average basal area, average age, and average height were also

calculated from the data. Information on trees marked for cut was summarized also. The summarized data were combined with management alternatives obtained from land managers and then processed through the simulated yield program SWYLD2.

RESULTS AND DISCUSSION

Cuba Ranger District (Archuleta)

A 652-acre area of two-storied ponderosa pine was sampled by collecting data on 102 plots. Location of the area is indicated in Figure 1. Line, plot, and dwarf mistletoe distribution are provided in Figure 2. Plots with dwarf mistletoe had a minimum of one infected sample tree. Dwarf mistletoe is distributed throughout the sampled area.

Survey Results Summary

	Overstory*	Understory**
Site index	70	70
Average age (years)	150	60
Average Height (feet)	67	31
Number trees/acre	44	417
Basal area/acre	44	24
Average d.b.h. (inches)	13.9	3.2
Percent trees infected with dwarf mistletoe	35	33

This basic stand information was combined with management alternatives selected by Ranger District personnel to produce 152 sets (set=1 overstory and 1 understory printout) of simulated yield tables. The yield tables were discussed and evaluated with personnel from Cuba Ranger District. Six yield tables were selected for use as examples in this report. The SWYLD2 program converts percent trees infected with mistletoe to stand DMR, based on the 6-class rating system. The stand DMR reflects average mistletoe rating for all trees in a sampled area.

Because overstory management alternatives were held constant, only one overstory simulation is presented (Table 1). About two-thirds of the overstory basal area was removed in the first cut, with the remainder being cut in 20 years (final removal). The first overstory cut simulated a logging from above, which reduced the dwarf mistletoe infestation to a low level (Table 1). The buildup of mistletoe in the 20 years before final removal resulted from latent infections in residual trees. Spread of dwarf mistletoe from infected residual overstory trees to understory is simulated for the 20-year period before final removal (Tables 1-6).

*Overstory = all live trees $\geq$ 9.0 inches d.b.h.
**Understory = all live trees $\geq$ 4.5 feet tall and $<$ 9.0 inches d.b.h.

All understory simulations were made to biological age 200 (Tables 2-6). The regeneration scheme was constant with a 2-cut shelterwood method being used. Regeneration cuts were made at age 180 (cut 60% of BA) and 200 (final removal). Various growing stock level (GSL) combinations were simulated for the initial thin and all subsequent intermediate cuts. A 10-year delay before the first stand entry was simulated (Tables 2, 5, & 6), as well as immediate entry in the stand (Tables 3 and 4). The initial entry in all understory simulations was a thinning from above, emphasizing removal of larger diameter trees.

The SWYLD2 program will not simulate intermediate cuts when stand DMR equals or exceeds 3.0 (Tables 2, 4, 5, & 6). The stand DMR of 3.0 indicates 86 percent of the trees are infected with dwarf mistletoe and the stand should be regenerated. The 10-year delay before initial stand entry resulted in a buildup of dwarf mistletoe which could not be controlled by subsequent intermediate cuts (Tables 2, 5, & 6). Tables 2 and 3 simulate the same management alternatives, with the exception of the 10-year delay before initial stand entry in Table 2. The delay allowed a buildup of dwarf mistletoe which resulted in total yields being reduced by 18,200 board feet (Table 2 vs. 3).

Various GSL combinations were tested, with an initial GSL 60 and subsequent GSL 90 producing the highest board-foot yield (Table 3). The importance of reducing mistletoe levels initially is exemplified by comparing Tables 3 and 4. The reduction in dwarf mistletoe levels appears to be similar in the initial thinning; however, latent infections and spread of mistletoe from overstory to understory were greater in Table 4 because more trees were left after thinning. Adequate reduction of mistletoe levels in the initial thinning and all subsequent stand entries resulted in control of dwarf mistletoe and an acceptable timber yield (Table 3). By close examination of the yield tables, land managers can select the combination of management alternatives that best meet current management objectives.

Jemez Ranger District

Two-storied stands of ponderosa pine were surveyed in two locations on the Jemez Ranger District in 1976. A 627-acre area and a 217-acre area were sampled by collecting data on 98 and 34 plots, respectively. Location of the areas is provided in Figure 3. Line, plot, and dwarf mistletoe distribution are presented in Figures 4 (Stand I) and 5 (Stand II). Plots with dwarf mistletoe had a minimum of one infected sample tree. Dwarf mistletoe is present in much of Stand I, except along the western edge of the area. In Stand II, mistletoe is only found in the western half of the area.

Survey Results Summary

Stand I Rivera	Overstory*	Understory**
Site index	87	87
Average age (years)	130	60
Average height (feet)	90	44
Number trees/acre	40	623
Basal area/acre	47	49
Average d.b.h. (inches)	14.6	3.8
Percent trees infected with dwarf mistletoe	28	28
Stand II		
Site index	76	76
Average age (years)	120	40
Average height (feet)	78	27
Number trees/acre	16	1609
Basal area/acre	24	50
Average d.b.h. (inches)	16.8	2.4
Percent trees infected with dwarf mistletoe	14	1

This basic stand information was combined with management alternatives selected by Ranger District personnel to produce 12 sets of yield tables for Stand I and 6 sets for Stand II. The yield tables were discussed and evaluated with personnel from Jemez Ranger District. Seven yield tables from Stand I were selected for use as examples in this report. Overstory management alternatives were constant; thus, only one overstory simulation is presented. About 30 percent of the overstory basal area was removed in the initial cut, with the remainder being cut in 20 years (Table 7). Spread of dwarf mistletoe from overstory to understory is simulated in the SWYLD2 program. Based on the sample of trees actually marked for cut in Stand I, the DMR will remain at .3 after the timber sale. Thus, the buildup of dwarf mistletoe in the overstory and spread of the disease into understory will be greater than that simulated in Tables 7-13.

Understory simulations were made to biological age 160. A 3-cut shelterwood method was simulated, with cuts at 120, 140, and 160 years. All management alternatives were constant, except thinning method and intensity. Thinnings were performed from above in the initial stand entry (Tables 9, 11, & 13), as well as from below (Tables 8, 10, & 12). Various GSL combinations were tested to determine which levels result in maximum volume production on the area.

*Overstory = all live trees ≥ 9.0 inches d.b.h.
**Understory - all live trees ≥ 4.5 feet tall and < 9.0 inches d.b.h.

Thinning from below resulted in higher overall board-foot yields than thinning from above (Tables 8, 10, & 12 vs. 9, 11, & 13). Dwarf mistletoe was controlled in all simulations; thus, variation in total yields resulted from altering initial and subsequent thinning levels. The combination of 90 GSL for initial and 100 GSL for subsequent thinnings resulted in the highest board-foot yield over a rotation (Table 10). Other combinations using a higher initial GSL (Table 12) or lower initial and subsequent GSL's (Table 8) resulted in lower overall yields. Simulated yield tables generated by the SWYLD2 program will aid land managers in selecting a combination of management alternatives that best meets current management objectives.

CONCLUSIONS AND RECOMMENDATIONS

Sufficient stand data were obtained on Cuba and Jemez Ranger Districts for use in the simulated yield program SWYLD2. The data were combined with various management alternatives selected by Ranger District personnel, and yield tables were produced for each sample area. Examination of yield tables by the land manager and personnel from Forest Insect and Disease Management revealed several important factors: (1) volume losses caused by dwarf mistletoe can be substantial when infested stands are improperly treated (FSM 5200); (2) control of dwarf mistletoe is dependent on management alternatives selected for use in a particular area; (3) total volume production per acre is dependent on management alternatives selected for use in a particular area.

The simulated yield program SWYLD2 is a useful tool for land managers. The limits of the program will be revealed after on-the-ground situations, in which simulated yield information has been used, are compared with their simulated yields. Based on results of this report, the following plan of action is recommended for the areas sampled on Cuba and Jemez Ranger Districts:

1. Select the yield table and accompanying management alternatives that best meet current management objectives, while reducing dwarf mistletoe to acceptable levels (FSM 5260).

2. Implement management alternatives selected for the first stand entry in the overstory and understory.

3. With the assistance of personnel from the Forest Insect and Disease Management Staff Unit, complete a post-treatment evaluation of the area.

4. Compare results of the post-treatment evaluation with simulated yield predictions (Phase II).

The growing stock levels used to generate yield tables for stands considered in this report are not intended as "best" growing stock levels for widespread use; however, they demonstrate the need for case-by-case selection of a suitable level based on the manager's objectives in conjunction with mistletoe management.

Instructions for use of the SWYLD2 program and detailed descriptions of management alternatives are provided by Edminster and Hawksworth (1976). Additional information on the SWYLD2 program, relative to dwarf mistletoe management, may be obtained by contacting Forest Insect and Disease Management. For general information on the SWYLD2 program, contact Forest Insect and Disease Management or Timber Management.

LITERATURE CITED

Edminster, C. B., and F. G. Hawksworth. 1976. User's guide to SWYLD2: Yield tables for even-aged and two-storied stands of southwestern ponderosa pine, including effects of dwarf mistletoe. USDA Forest Serv. Gen. Tech. Rep. RM-23. 8 pp.

Myers, C. A., C. B. Edminster, and F. G. Hawksworth. 1976. SWYLD2: Yield tables for even-aged and two-storied stands of southwestern ponderosa pine, including effects of dwarf mistletoe. USDA Forest Serv. Res. Pap. RM-163. 25 pp.

Walters, J. W., and B. W. Geils. 1976. Simulated yield tables for dwarf mistletoe management in ponderosa pine stands (SWYLD2 program). Tech. Rep. R-3 76-21. 22 pp.

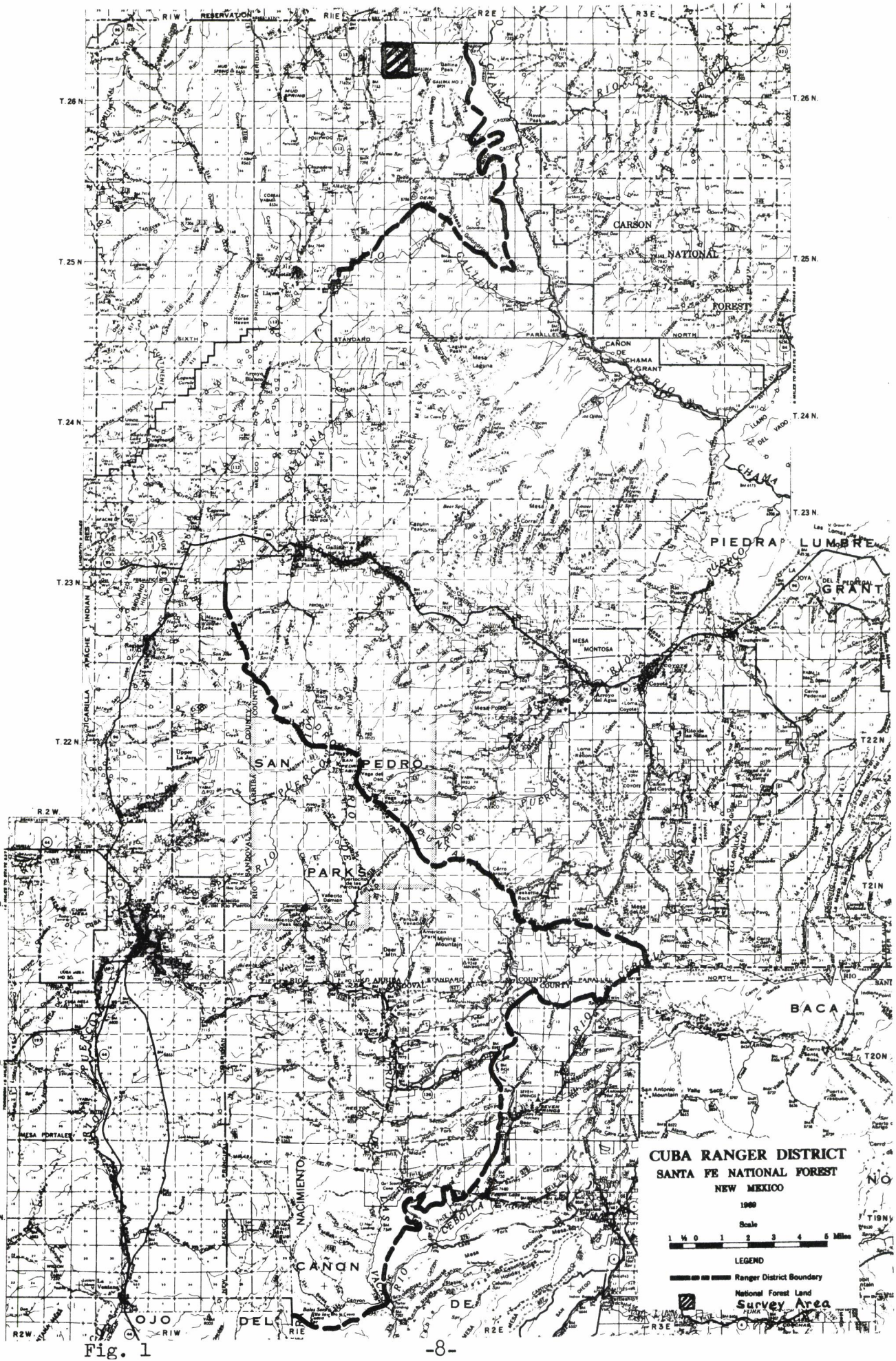
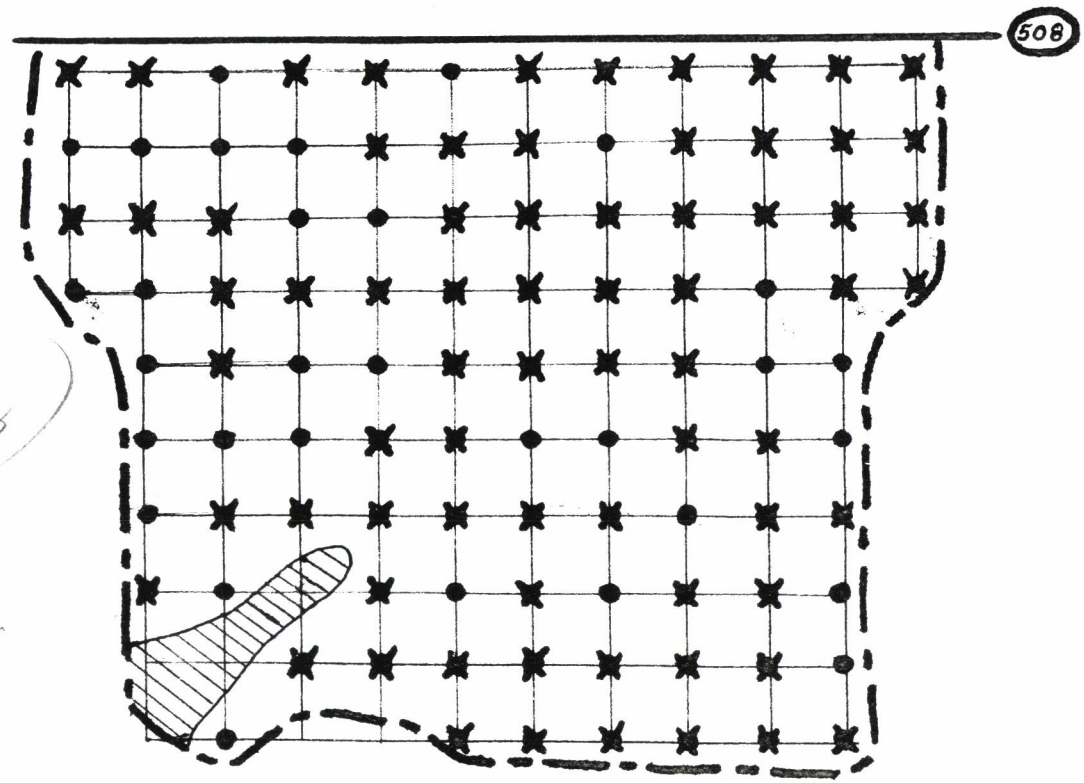

CUBA RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1980
Scale
1 ½ 0 1 2 3 4 5 Miles
LEGEND
Ranger District Boundary
National Forest Land
Survey Area
CARSON
NATIONAL
FOREST
PIEDRA LUMBRE
GRANT
SAN PEDRO
PARKS
BACA
CAÑON DE CHAMA GRANT
MESA MONTOSA
CAÑON DE VACA
OJO DEL
NACIMIENTO
MESA PORTALES
T. 26 N.
T. 25 N.
T. 24 N.
T. 23 N.
T. 22 N.
T. 21 N.
T. 20 N.
T. 19 N.
R2W.
R1E
R2E
R3E

Fig. 1



LEGEND

- Plots with dwarf mistletoe
- Plots with no dwarf mistletoe
- Non-type area
- Survey area boundary
- Forest road and boundary

102 plots
652 acres

Scale: 1 cm = 8 chains

Fig. 2.--Line and plot distribution with an indication of dwarf mistletoe presence or absence; Cuba Ranger District, T26N, R1E, Sec. 12.

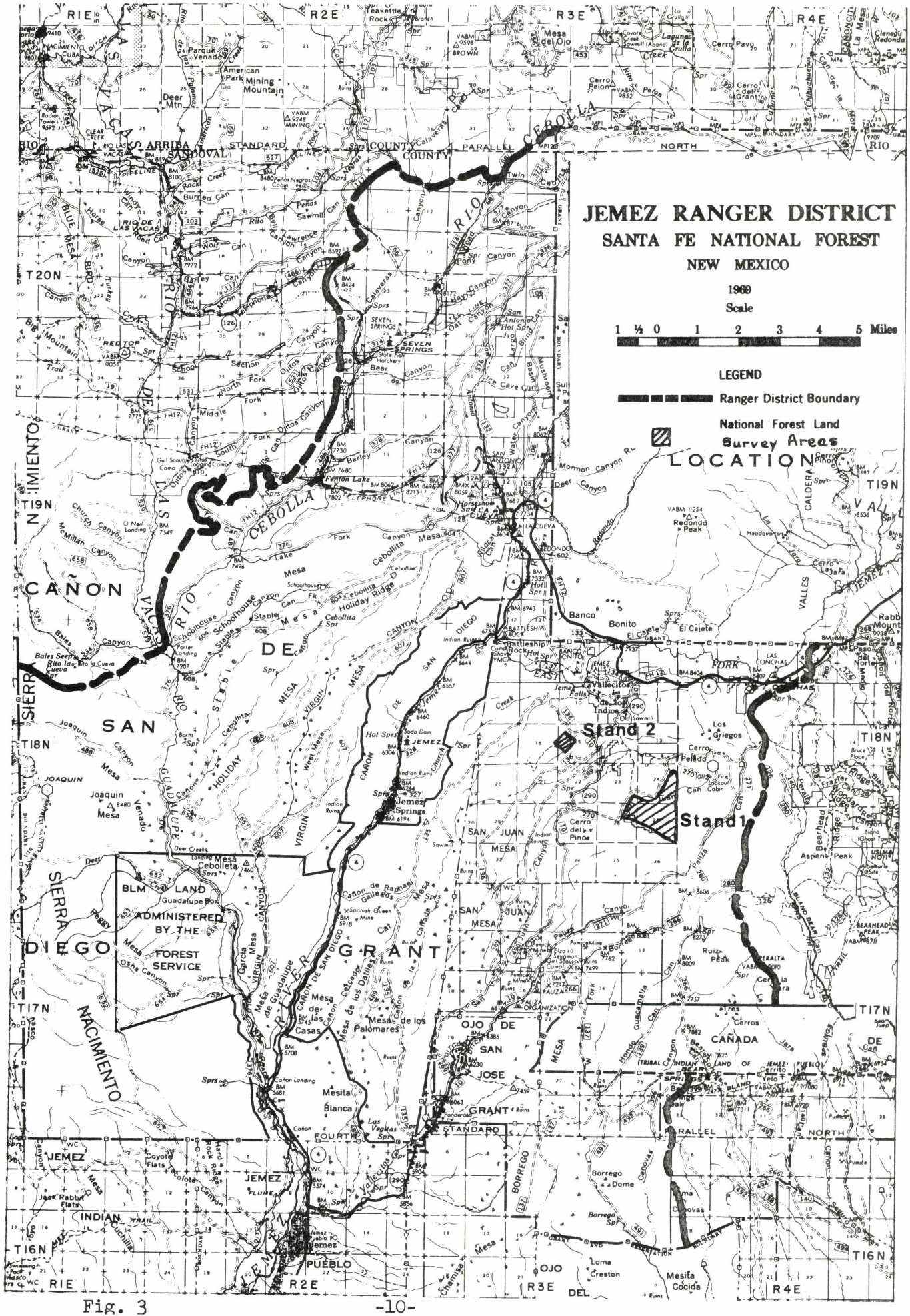

JEMEZ RANGER DISTRICT
SANTA FE NATIONAL FOREST
NEW MEXICO
1969
Scale
1 ½ 0 1 2 3 4 5 Miles
LEGEND
Ranger District Boundary
National Forest Land
Survey Areas
LOCATION
Stand 1
Stand 2
BLM LAND ADMINISTERED BY THE FOREST SERVICE
SANDOVAL COUNTY
RIO ARRIBA COUNTY
STANDARD PARALLEL NORTH
SIERRA NACIMIENTO
SAN PEDRO PARKS
CAÑON DE VALLES
JEMEZ SPRINGS
SEVEN SPRINGS
LA CUEVA
BANCO BONITO
VALLECITOS
OJO DE LA CASA
OJO SAN JOSE
MESITA BLANCA
MESA DE LOS PALOMARES
MESA DE LAS CASAS
CAÑON DE SAN DIEGO
CAÑON DE RAMON GALLEGOS
SPANISH QUEEN MINE
JEMEZ PUEBLO
CAÑADA DE JEMEZ
INDIAN TRIBAL LAND OF JEMEZ PUEBLO
BEARHEAD PEAK
REDONDO PEAK
RABBIT MOUNTAIN
T20N
T19N
T18N
T17N
T16N
R1E
R2E
R3E
R4E

Fig. 3

98 plots
627 acres

Scale: 1 cm = 8 chains

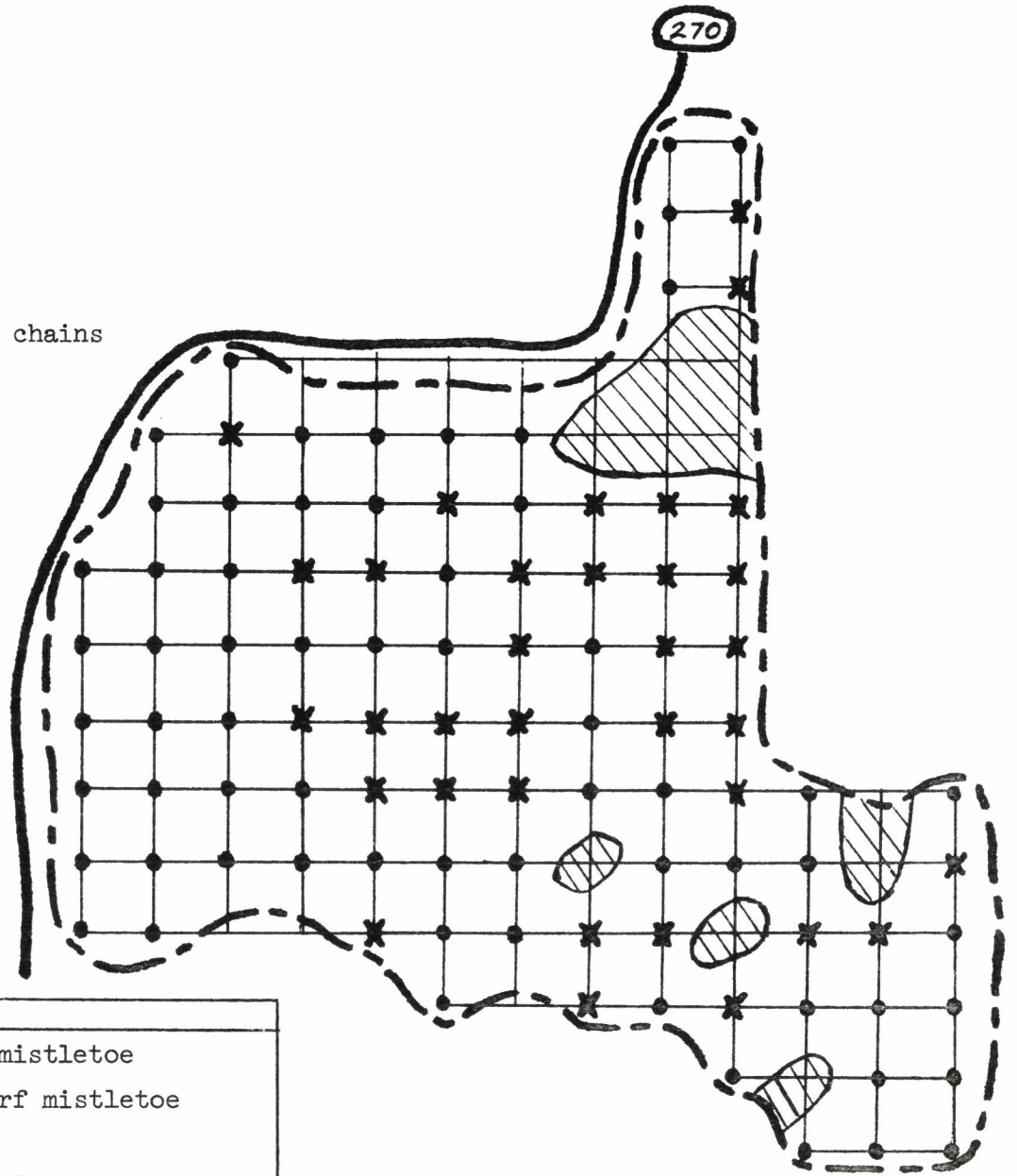


Fig. 4.--Line and plot distribution with an indication of dwarf mistletoe presence or absence; Jemez Ranger District; T18N, R3E, Sec. 24, 25, & 26; Stand I. Rivera

34 plots
218 acres

Scale: 1 cm = 8 chains

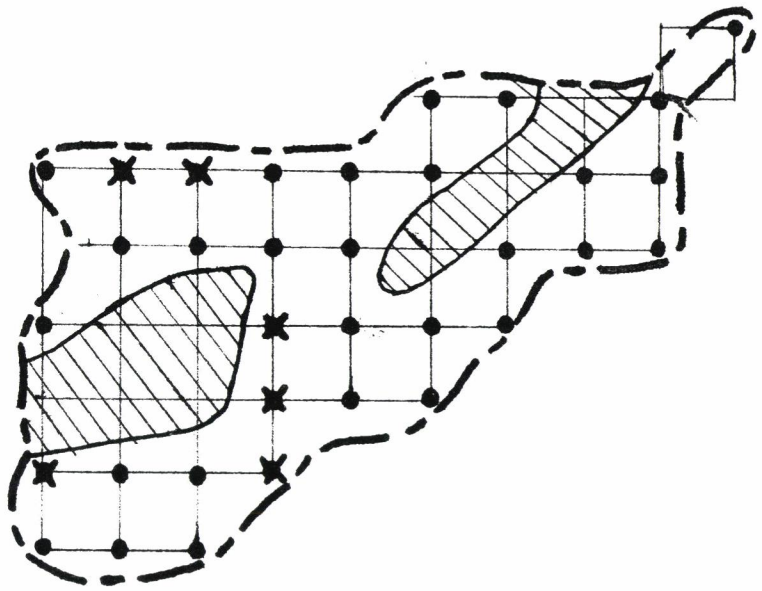


Fig. 5.--Line and plot distribution with an indication of dwarf mistletoe presence or absence; Jemez Ranger District; T18N, R3E, Sec. 15; Stand II.

LEGEND

- Plots with dwarf mistletoe
- Plots with no dwarf mistletoe
- Non-type area
- Survey area boundary

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10., OVERSTORY.

SITE INDEX 70

THINNING INTENSITY-- INITIAL- 43. SUBSEQUENT- 43.

STAND 10 ARCHULETA CUBA RD 76

	CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
150	.4	44	46	13.9	67	1160	1090	4300					
150	.0+	19	16	12.4	65	380	350	1300	25	30	780	740	3000
160	.2	19	21	14.1	67	510	480	1900					
170	.2	19	25	15.4	68	630	600	2500					
							TOTAL YIELDS				1410	1340	5500

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 150., 35. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 1

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10., UNDERSTORY.

SITE INDEX 70
THINNING INTENSITY-- INITIAL= 60. SUBSEQUENT= 90.

STAND 10 ARCHULETA CUBA RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.4	417	23	3.2	31	460	0	0					
70	.8	415	50	4.7	38	850	0	0					
70	.0+	286	29	4.3	36	500	0	0	129	21	350	0	0
80	.4	284	49	5.6	42	820	330	0					
90	.9	282	75	7.0	47	1310	920	0					
90	.7	275	73	7.0	47	1280	900	0	7	2	30	20	0
100	1.1	273	98	8.1	51	1780	1450	600					
110	2.0	247	109	9.0	54	2090	1810	2200					
110	1.6	187	88	9.3	55	1690	1480	2100	60	21	400	330	100
120	2.4	167	97	10.3	58	2020	1820	4300					
130	3.3	143	98	11.2	61	2170	1980	6400					
130	3.3	143	98	11.2	61	2170	1980	6400	0	0	0	0	0
140	4.1	117	93	12.1	63	2180	2010	7200					
150	4.9	92	86	13.1	65	2090	1950	7400					
150	4.9	92	86	13.1	65	2090	1950	7400	0	0	0	0	0
160	5.3	69	75	14.1	67	1880	1760	7000					
170	5.7	51	63	15.1	69	1640	1550	6500					
170	5.7	51	63	15.1	69	1640	1550	6500	0	0	0	0	0
180	6.0-	37	53	16.2	70	1400	1340	5800					
180	5.6	23	37	17.1	71	990	940	4300	14	16	410	400	1500
190	5.9	17	32	18.6	72	880	850	4100					
200	6.0-	13	29	20.1	74	800	780	4000					
								TOTAL YIELDS			1990	1530	5600

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 33. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 2

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10., UNDERSTORY.

SITE INDEX 70

THINNING INTENSITY-- INITIAL- 60, SUBSEQUENT- 90,

STAND 10 ARCHULETA CUBA RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.4	417	23	3.2	31	460	0	0					
60	.0+	355	19	3.1	29	370	0	0	62	4	90	0	0
70	.2	353	43	4.7	36	690	0	0					
80	.2	350	66	5.9	42	1100	530	0					
80	.0+	325	64	6.0	42	1050	530	0	25	2	50	0	0
90	.1	323	91	7.2	47	1580	1150	0					
100	.2	320	117	8.2	51	2140	1760	1000					
100	.0+	215	85	8.5	51	1550	1310	900	105	32	590	450	100
110	.1	214	105	9.5	55	2020	1790	2900					
120	.1	213	126	10.4	58	2650	2400	6100					
120	.0+	144	90	10.7	59	1920	1740	4700	69	36	730	660	1400
130	.1	144	108	11.7	61	2440	2240	7900					
140	.1	144	125	12.6	64	2970	2750	10200					
140	.0+	98	90	13.0	65	2170	2020	7600	46	35	800	750	2600
150	.1	98	105	14.0	67	2620	2460	9700					
160	.1	98	119	14.9	69	3070	2900	12000					
160	.0+	71	89	15.2	69	2330	2210	9200	27	30	740	690	2800
170	.1	71	102	16.2	71	2730	2600	11400					
180	.1	71	115	17.2	72	3150	3020	13800					
180	.0+	18	30	19.2	75	1030	990	4900	53	79	2120	2030	8900
190	.1	18	43	20.9	76	1250	1210	6400					
200	.1	18	50	22.5	77	1470	1440	8000					
								TOTAL YIELDS	6590	6000	23800		

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 33. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 3

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10., UNDERSTORY,

SITE INDEX 70
THINNING INTENSITY-- INITIAL- 70, SUBSEQUENT- 70,

STAND 10 ARCHULETA CUBA RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.4	417	23	3.2	31	460	0	0					
60	.0+	402	22	3.2	29	430	0	0	15	1	30	0	0
70	.4	400	48	4.7	36	790	0	0					
80	.8	396	73	5.8	42	1220	550	0					
80	.2	244	51	6.2	43	850	470	0	152	22	370	80	0
90	.7	243	75	7.5	48	1300	990	0					
100	1.1	242	98	8.6	52	1790	1520	1300					
100	.5	154	68	9.0	52	1260	1090	1200	88	30	530	430	100
110	1.0	153	87	10.2	56	1750	1570	3500					
120	1.4	153	105	11.2	59	2260	2070	6700					
120	.8	95	70	11.6	60	1530	1400	4900	58	35	730	670	1800
130	1.2	95	85	12.8	63	1970	1830	6800					
140	2.0	87	92	13.9	65	2230	2090	8200					
140	1.6	64	70	14.2	66	1730	1620	6500	23	22	500	470	1700
150	2.4	58	75	15.4	68	1910	1810	7700					
160	3.1	51	77	16.6	70	2020	1930	8600					
160	3.1	51	77	16.6	70	2020	1930	8600	0	0	0	0	0
170	3.8	43	74	17.8	71	2010	1930	9000					
180	4.5	35	69	19.0	73	1910	1850	9100					
180	3.5	12	28	20.5	75	780	760	3900	23	41	1130	1090	5200
190	4.3	12	33	22.4	76	950	930	5200					
200	5.1	10	32	24.1	77	940	920	5400					
								TOTAL YIELDS			4230	3660	14200

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 33. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 4

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10,, UNDERSTORY,

SITE INDEX 70
THINNING INTENSITY-- INITIAL- 90, SUBSEQUENT- 70,

STAND 10 ARCHULETA CUBA RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.4	417	23	3.2	31	460	0	0					
70	.8	415	50	4.7	38	850	0	0					
70	.4	376	43	4.6	37	730	0	0	39	7	120	0	0
80	.8	373	68	5.8	42	1160	520	0					
90	1.2	370	96	6.9	47	1690	1170	0					
90	.5	204	59	7.3	48	1050	780	0	166	37	640	390	0
100	1.0	203	80	8.5	52	1490	1250	900					
110	1.4	202	102	9.6	56	2020	1790	3100					
110	.8	128	70	10.0	57	1410	1260	2500	74	32	610	530	600
120	1.3	127	87	11.2	60	1890	1730	5500					
130	2.1	116	94	12.2	62	2170	2010	7300					
130	1.6	82	70	12.5	63	1630	1510	5500	34	24	540	500	1800
140	2.4	74	76	13.7	65	1850	1730	6800					
150	3.2	64	76	14.8	68	1940	1830	7500					
150	3.2	64	76	14.8	68	1940	1830	7500	0	0	0	0	0
160	4.0	53	73	15.9	70	1920	1820	7900					
170	4.7	43	69	17.1	71	1850	1770	8000					
170	4.7	43	69	17.1	71	1850	1770	8000	0	0	0	0	0
180	5.0	33	60	18.3	73	1670	1600	7700					
180	4.2	13	27	19.6	74	770	740	3700	20	33	900	860	4000
190	5.0	11	27	21.4	76	790	770	4100					
200	5.4	9	26	25.2	77	780	760	4300					
								TOTAL YIELDS			5590	3040	10700

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60,, 33. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 5

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 10,, UNDERSTORY,

SITE INDEX 70
THINNING INTENSITY-- INITIAL- 90, SUBSEQUENT- 90,

STAND 10 ARCHULETA CUBA RD 76

CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.4	417	23	3.2	31	460	0	0					
70	.8	415	50	4.7	38	850	0	0					
70	.4	376	43	4.6	37	730	0	0	39	7	120	0	0
80	.8	373	68	5.8	42	1160	520	0					
90	1.2	370	96	6.9	47	1690	1170	0					
90	.7	266	75	7.2	48	1320	970	0	104	21	370	200	0
100	1.2	264	99	8.3	52	1840	1520	900					
110	2.0	238	110	9.2	55	2130	1860	2600					
110	1.6	181	89	9.5	56	1770	1560	2500	57	21	360	300	100
120	2.5	161	97	10.5	59	2070	1870	4700					
130	3.3	137	97	11.4	62	2200	2020	6900					
130	3.3	137	97	11.4	62	2200	2020	6900	0	0	0	0	0
140	4.2	112	94	12.4	64	2230	2070	7600					
150	5.0	88	85	13.3	66	2100	1960	7500					
150	5.0	88	85	13.3	66	2100	1960	7500	0	0	0	0	0
160	5.4	66	74	14.3	68	1880	1770	7100					
170	5.8	49	63	15.3	70	1640	1560	6500					
170	5.8	49	63	15.3	70	1640	1560	6500	0	0	0	0	0
180	6.0-	36	53	16.4	71	1420	1360	6000					
180	5.7	22	36	17.3	72	980	940	4300	14	17	440	420	1700
190	5.9	16	31	18.8	73	860	830	4000					
200	6.0-	12	27	20.4	75	780	750	3900					
							TOTAL YIELDS		2070	1670	5700		

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60,, 33. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.
NOTE THAT NOT ALL SCHEDULED THINNINGS WERE POSSIBLE.

Table 6

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., OVERSTORY.

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 47. SUBSEQUENT- 47.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
130	.3	40	47	14.6	90	1570	1480	6000					
130	.0+	33	35	14.0	88	1170	1100	4400	7	12	400	380	1600
140	.1	33	43	15.4	91	1470	1400	5900					
150	.2	33	49	16.5	94	1740	1660	7400					
							TOTAL YIELDS				2140	2040	9000

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 130., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 7

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY,

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 80. SUBSEQUENT- 90.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	397	36	4.1	45	750	0	0	226	13	300	0	0
70	.1	392	62	5.4	53	1290	450	0					
80	.2	383	91	6.6	61	2040	1320	0					
80	.0+	280	73	6.9	61	1620	1120	0	103	18	420	200	0
90	.1	278	102	8.2	67	2400	1980	1000					
100	.1	275	130	9.3	72	3390	2970	4600					
100	.0+	174	89	9.7	73	2350	2090	3700	101	41	1040	880	900
110	.1	173	112	10.9	77	3180	2890	8600					
120	.1	173	134	11.9	80	4010	3690	13200					
120	.0+	65	63	13.3	82	1920	1790	6900	108	71	2090	1900	6300
130	.1	65	77	14.7	85	2460	2320	9500					
140	.1	65	91	16.0	88	3020	2870	12500					
140	.0+	18	31	17.8	90	1060	1020	4800	47	60	1960	1850	7700
150	.1	18	38	19.8	92	1350	1310	6600					
160	.1	18	46	21.6	94	1650	1610	8700					
						TOTAL YIELDS					7460	6440	23600

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 8

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY.

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 80. SUBSEQUENT- 90.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	423	30	3.6	42	640	0	0	200	19	410	0	0
70	.1	418	59	5.1	51	1230	340	0					
80	.2	408	88	6.3	60	1960	1130	0					
80	.0+	294	70	6.6	60	1540	1000	0	114	18	420	130	0
90	.1	292	99	7.9	66	2310	1850	0					
100	.1	289	128	9.0	70	3250	2820	3600					
100	.0+	184	89	9.4	71	2280	2010	3000	105	39	970	810	600
110	.1	183	112	10.6	75	3110	2820	7500					
120	.1	183	134	11.6	79	3950	3630	12700					
120	.0+	67	63	13.1	80	1890	1760	6700	116	71	2060	1870	6000
130	.1	67	77	14.5	84	2420	2280	9200					
140	.1	67	91	15.8	86	2990	2840	12200					
140	.0+	18	31	17.7	88	1030	990	4600	49	60	1960	1850	7600
150	.1	18	38	19.7	91	1320	1280	6500					
160	.1	18	45	21.5	93	1620	1570	8500					
						TOTAL YIELDS					7440	6230	22700

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 9

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY.

SITE INDEX 87

THINNING INTENSITY-- INITIAL- 90. SUBSEQUENT- 100.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	447	41	4.1	44	840	0	0	176	8	210	0	0
70	.1	441	70	5.4	53	1470	520	0					
80	.2	429	102	6.6	62	2310	1490	0					
80	.0+	311	81	6.9	62	1820	1260	0	118	21	490	230	0
90	.1	309	111	8.1	68	2640	2150	1000					
100	.1	305	138	9.1	73	3630	3160	4400					
100	.0+	204	98	9.4	73	2610	2300	3500	101	40	1020	860	900
110	.1	203	122	10.5	77	3490	3160	8200					
120	.1	203	144	11.4	81	4350	3980	14300					
120	.0+	78	70	12.8	82	2150	2000	7500	125	74	2200	1980	6800
130	.1	78	86	14.2	86	2770	2600	10400					
140	.1	78	101	15.4	88	3380	3200	13500					
140	.0+	21	34	17.3	90	1180	1130	5200	57	67	2200	2070	8300
150	.1	21	42	19.2	93	1500	1440	7200					
160	.1	21	51	21.0	95	1840	1790	9500					
						TOTAL YIELDS					7960	6930	25500

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 10

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY.

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 90. SUBSEQUENT- 100.

STND 1 RIVERA JEMEZ 76

		CHARACTERISTICS BEFORE AND AFTER THINNING							PERIODIC INTERMEDIATE CUTS				
STAND AGE (YEARS)	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	468	33	3.6	42	710	0	0	155	16	340	0	0
70	.1	462	63	5.0	51	1320	0	0					
80	.2	450	94	6.2	60	2100	1160	0					
80	.0+	332	77	6.5	60	1700	1060	0	118	17	400	100	0
90	.1	329	106	7.7	66	2480	1940	0					
100	.1	325	134	8.7	70	3400	2900	3000					
100	.0+	219	97	9.0	71	2470	2140	2500	106	37	930	760	500
110	.1	218	121	10.1	75	3350	3020	6700					
120	.1	218	144	11.0	79	4220	3840	12200					
120	.0+	83	70	12.4	80	2090	1930	7100	135	74	2130	1910	5100
130	.1	83	86	13.8	83	2710	2540	9900					
140	.1	83	102	15.0	86	3330	3140	13000					
140	.0+	22	34	16.9	88	1150	1100	4900	61	68	2180	2040	8100
150	.1	22	42	18.8	91	1470	1410	6900					
160	.1	22	51	20.6	93	1810	1760	9200					
							TOTAL YIELDS				7790	6570	22900

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 11

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY.

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 100, SUBSEQUENT- 100.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	505	44	4.0	44	920	0	0	118	5	130	0	0
70	.1	497	76	5.3	53	1600	520	0					
80	.2	481	107	6.4	61	2430	1470	0					
80	.0+	321	79	6.7	62	1780	1180	0	160	28	650	290	0
90	.1	318	108	7.9	68	2580	2070	0					
100	.1	314	136	8.9	72	3550	3060	3700					
100	.0+	212	98	9.2	73	2580	2250	3000	102	38	970	810	700
110	.1	211	122	10.3	77	3470	3130	7600					
120	.1	211	144	11.2	81	4340	3970	13400					
120	.0+	81	70	12.6	82	2150	2000	7400	130	74	2190	1970	6000
130	.1	81	85	13.9	85	2740	2570	10100					
140	.1	81	101	15.1	88	3360	3180	13200					
140	.0+	22	35	17.0	90	1190	1130	5100	59	66	2170	2050	8100
150	.1	22	43	18.9	93	1510	1460	7100					
160	.1	22	51	20.6	95	1840	1790	9300					
						TOTAL YIELDS					7950	6910	24100

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING MUST BE FROM BELOW.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 12

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE, STAND NUMBER 1., UNDERSTORY.

SITE INDEX 87
THINNING INTENSITY-- INITIAL- 100. SUBSEQUENT- 100.

STND 1 RIVERA JEMEZ 76

STAND AGE (YEARS)	DMR	CHARACTERISTICS BEFORE AND AFTER THINNING: TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	PERIODIC INTERMEDIATE CUTS: TREES NO.	BASAL AREA SQ.FT.	TOTAL VOLUME CU.FT.	MERCHANTABLE VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.
60	.3	623	49	3.8	44	1050	0	0					
60	.0+	512	38	3.7	43	810	0	0	111	11	240	0	0
70	.1	505	72	5.1	51	1490	410	0					
80	.2	489	103	6.2	60	2280	1260	0					
80	.0+	332	77	6.5	60	1700	1070	0	157	26	580	190	0
90	.1	329	106	7.7	66	2480	1950	0					
100	.1	325	134	8.7	71	3410	2910	3000					
100	.0+	219	97	9.0	71	2480	2150	2500	106	37	930	760	500
110	.1	218	121	10.1	75	3360	3020	6700					
120	.1	218	144	11.0	79	4220	3850	12200					
120	.0+	83	70	12.4	80	2090	1930	7100	135	74	2130	1920	5100
130	.1	83	86	13.8	84	2710	2540	10000					
140	.1	83	102	15.0	86	3330	3150	13000					
140	.0+	22	34	16.9	88	1150	1100	5000	61	68	2180	2050	8000
150	.1	22	42	18.8	91	1470	1420	6900					
160	.1	22	51	20.6	93	1810	1760	9200					
						TOTAL YIELDS					7870	6680	22800

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
DWARF MISTLETOE RATING ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
MINIMUM CUTS FOR INCLUSION IN TOTAL YIELDS-- 1. CUBIC FEET AND 1. BOARD FEET.
ALL THINNINGS MAY BE NONCOMMERCIAL.
AT INITIAL AGE 60., 28. PERCENT OF THE TREES WERE INFECTED WITH DWARF MISTLETOE.

Table 13